

Joint Center for Ocean Observing Technology

Region: Northeast

Date Project Initiated: September 2005

Brief Project Summary

The National Oceanic and Atmospheric Administration (NOAA)-University of New Hampshire Joint Center was established to develop and demonstrate new ocean observing technologies. The Center focuses on the synergistic use of data from existing land, atmosphere, and ocean observing systems and builds models that predict coastal and ocean environmental conditions. Through innovative partnerships, the center is working to identify technological gaps and to find cost-effective solutions to close them. Prototype products developed and demonstrated by the center will be transitioned to regional and national ocean observing networks and to operational agencies.

Key Accomplishments

Enhanced Coastal Meteorological Measurements and Modeling

- The center has established a suite of atmospheric remote sensing and in situ observations on Appledore Island in the Gulf of Maine. These real-time measurements are viewable on the Internet and provide detailed meteorological parameters for mariners, including visibility, cloud base, and a Web cam to view actual weather conditions over the coastal ocean. Vertical atmospheric profile measurements are also being developed to enhance the atmospheric correction of ocean color satellite data and therefore improve the capability to monitor oceanic biological properties from space-borne platforms. A 3-kilometer resolution mesoscale meteorological model (MM5) is now being run at UNH in operational forecast mode for the Gulf of Maine region. This model assimilates all regional observing system buoy and station data, as well as near-real-time QuikSCAT scatterometer data. A 48-hour forecast product is being piped directly to the NWS Eastern Region Headquarters and then to the Gray, Maine, forecast office. Forecasters there are working with the center to evaluate its value to regional marine weather prediction.

Climate and Ecosystem Change

- The center has teamed up with NOAA's Pacific Marine Environmental Laboratory (PMEL) to provide the first continental U.S. node of its coastal network of offshore buoys to monitor carbon dioxide (CO₂) gas concentration levels along the U.S. coast. The center's Gulf of Maine CO₂ buoy was developed and deployed in spring 2006 and has since been joined by systems off Georgia and Washington. Data are displayed in real time at NOAA/PMEL's coastal CO₂ Web site and will be archived at the U.S. Department of Energy's oceanic Carbon Dioxide Information Analysis Center (CDIAC) to serve U.S. needs in assessing the coastal ocean's role in climate and ecosystem change.

High-Resolution Hydrodynamic Model

- The center has implemented the first-ever high-resolution operational discharge model for the entire Gulf of Maine. This is a "composite" model that blends modeled atmospheric output (from the Center's 3-kilometer-resolution numerical weather prediction model) and USGS daily discharge data into the UNH water balance model to provide daily water fluxes to the coast at 9-kilometer resolution. The product provides coverage for

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This project is contributing to the Integrated Ocean Observing System (IOOS) by

- Acquiring and providing meteorological and biological data and products
- Measuring carbon levels and flux to serve U.S. needs in assessing the coastal ocean's role in climate and ecosystem change
- Modeling atmospheric and terrestrial inputs to the coast in partnership with Atmospheric and Environmental Research Inc. (AER) and the U.S. Geological Survey (USGS)



ungauged regions and produces data during times of icing and gauge malfunction. This model provides the framework for UNH nutrient flux models and thus will be of relevance to the planning and implementation of the Global Earth Observation System of Systems (GEOSS) and aligned with priorities in the U.S. Ocean Action Plan that call for a detailed assessment of terrestrial inputs to estuaries.

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